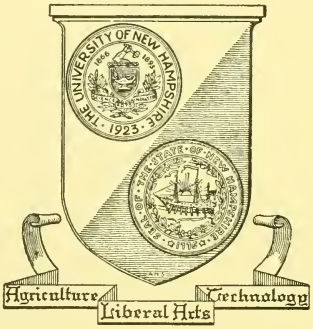
SHOUT
SHARE
IT

Library of



The University
of
New Hampshire

STATION BULLETIN 436 APRIL 1957

COMPETITION FOR NEW ENGLAND APPLES ON UNITED STATES MARKETS

1. Market Prospects for Growers

By

Joseph Gartner and J. R. Bowring

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF NEW HAMPSHIRE
DURHAM, NEW HAMPSHIRE

Foreword

This bulletin is the first in a series dealing with economic problems of the fruit and vegetable industries of New Hampshire and of New England. It is an approximation of the competitive position of the New England apple industry in the United States and what this means by way of market potentials for growers.

COMPETITION FOR NEW ENGLAND APPLES ON UNITED STATES MARKETS

1. MARKET PROSPECTS FOR GROWERS

By Joseph Gartner and J. R. Bowring*

Apple Production in the United States

COMMERCIAL apple production in the United States has been characterized by year-to-year fluctuations which can be attributed in part to the proclivity of the apple tree itself. A tree producing a large crop one year will in turn produce a small crop the following year. During the 1930's, the vacillations in the supply of apples appeared in 2 year cycles. After 1941, there appeared two three-year cycles and one four-year cycle. The extent to which the war effort, climatic conditions, and other factors caused these irregularities in the production cycle is difficult to measure. Probably no one factor can be held responsible for this interruption of the production cycle. (Total United States commercial production of apples has been declining at a slow and constant rate since 1934.)

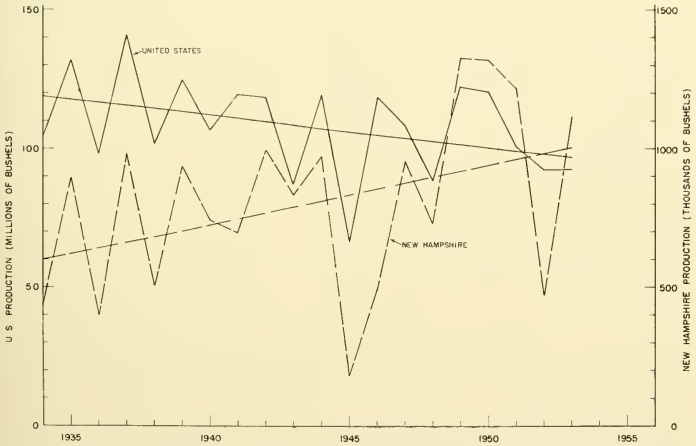


Figure 1. United States and New Hampshire commercial apple production having value, 1934-53.

---

* Mr. Gartner was a graduate research assistant and Dr. Bowring is Associate Economist for the New Hampshire Agricultural Experiment Station. This bulletin is based on a master's thesis submitted by the senior author to the University of New Hampshire in 1956. The authors are indebted to Prof. William Drew, New Hampshire Agricultural Experiment Station, for his review and criticism.

Although there is a similarity in year-to-year fluctuations in production, the long run trend in apple production for the United States has been decreasing while New Hampshire and New England production has been increasing. This divergency in production patterns is of importance to our analysis of the future outlook for the industry.

Upon examination of the supply patterns of various regions throughout the United States, it was found that the year-to-year production fluctuations common to New Hampshire and the United States also existed for other regions. *

The number of apple farms and of apple trees in the United States has declined continually since 1930. Numbers of trees dropped from 116,303,353 in 1930 to 50,559,124 in 1950. Numbers of farms growing apples during this time interval dropped from 2,297,074 in 1930 to 1,556,716 in 1950. However,the rate of decline in the number of apple trees and farms for the United States has recently slowed down.

Production in New Hampshire

New Hampshire has followed the general pattern of farm and tree reduction which is characteristic of the United States as a whole. Since 1930, both farm and tree numbers have been declining as shown in Table 1. The decrease in numbers of farms and trees during 1940-1950 as compared with 1930-1940 however has slowed down remarkably. The reduction of numbers of farms giving up apple production during 1940-1950, however, as compared with 1930-1940 might be an underestimation because of a redefinition of farm size in the 1950 census.

Table 1. Trends in Apple Farms and Tree Numbers in the United States and New Hampshire, 1930-1950

	1930	1940	1950	Percent Change 1930-40	Percent Change 1940-50
		United States			
Apple Farms	2,297,074	1,814,095	1,556,716	—21.0	—14.2
Total Trees	116,303,353	71,277,106	50,559,124	—38.7	—29.1
Bearing Trees	88,848,124	57,786,575	39,497,427	—40.0	—31.6
Non-Bearing Trees	27,455,229	13,490,531	11,061,607	—50.9	—18.0
Average Trees Per Farm	51	39	32	—23.5	—17.9
		New Hampshire			
Farms Growing Apples	8,748	5,471	4,088[1]	—37.5	—25.3
Total Trees	705,941	455,757	378,828	—35.4	—16.9
Bearing Trees	460,076	366,108	326,108	—20.4	—10.7
Non-Bearing Trees	245,865	89,649	51,839	—63.5	—42.2
Average Trees Per Farm	81	83	93	3.7	12.0

Source: Based on data taken from the United States Census of Agriculture, United States Department of Commerce, Bureau of the Census, 1930, 1940, 1950.

[1] The number of growers dependent on apples as their major source of income is estimated at 700 to 750.

The percent of farms moving out of apple production in New Hampshire is considerably larger than the percent reduction of farms for the United

* See Appendix, Figures 5, 6, 7, 8.

States. The percentage decline of bearing trees for New Hampshire has been smaller than the decline for the United States. This indicates that New Hampshire apple orchards are increasing in average size relative to United States apple orchards.

The number of non-bearing trees in New Hampshire, however, declined a great deal more between 1940 and 1950 than did the proportionate number of non-bearing trees in the United States. These changes indicate that production in New Hampshire will probably decline more rapidly in the future relative to the United States. Since no statistics on age distribution of trees in New Hampshire are available, it is difficult to determine when and if the downward turn in production will occur. Much will depend on the current rate of new planting.

Apples are the most important fruit produced in New Hampshire. Producers harvest and market between 400,000 and 1,500,000 bushels annually. Apple sales contribute approximately 3.2 percent to the total farm marketing receipts in the State, ranking sixth in the total amount contributed to agricultural income.

Although ten New Hampshire counties produce apples, commercial apple production is most highly developed in the southern part of the state. The three major apple producing counties (Hillsborough, Rockingham, and Merrimack) contained approximately 77 percent of the total number of trees in 1950.

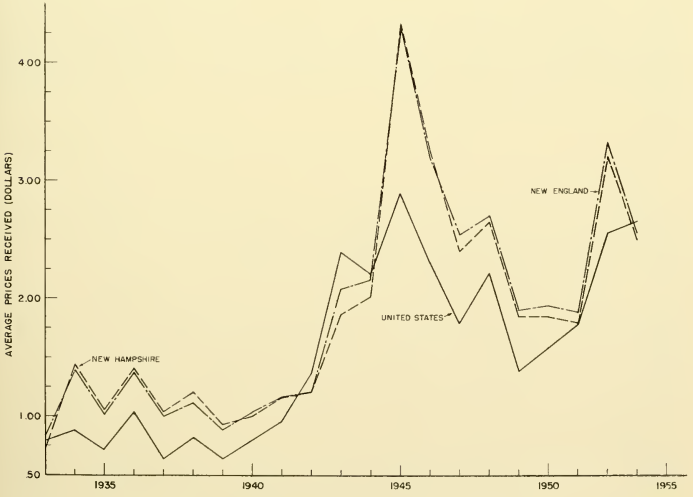


Figure 2. Average prices received for apples by New Hampshire, New England, and United States growers, 1933-53.

Price Variations

Apple prices are extremely variable, not only from one season to another, but within the season as well. Average prices received by farmers in the United States have varied from less than $1.00 a bushel in some seasons

to more than $3.00 in others during the past 20 years. Within season prices tend to be lowest during the fall months, increase during the winter months, and reach a peak in the early spring. The increase in price is due to diminishing quantities available and increasing cost of farm or commercial storage. If storage of apples takes place on a considerable scale, it decreases available supplies on the market and tends to raise the price. At the same time the prospective price of later sales should increase by the cost of storage.

Figure 2 shows average farm prices for apples received by United States, New England, and New Hampshire growers over a period of 21 years. It is of interest to note the close relationship between these price series. This indicates that apple prices received by New Hampshire growers are part of the structure of prices in New England and these in turn bear a definite and stable relationship to the average prices in the United States. The spread between the average prices received in the United States, New England, and New Hampshire, except for several years, has been fairly constant. The similarity of direction of price movement and the constant spread would indicate that there is one market for apples, differing between regions due to cost of transportation and premiums paid for variety and quality of apples.

Changes in Demand

The per capita consumption of fresh apples in the United States has declined from approximately 50 pounds in 1931 to about 25 pounds in 1947. The drop in consumption during the 1930's was much more severe than during the 1940's. Since 1948, consumption appears to have leveled off at about 25 pounds per capita.

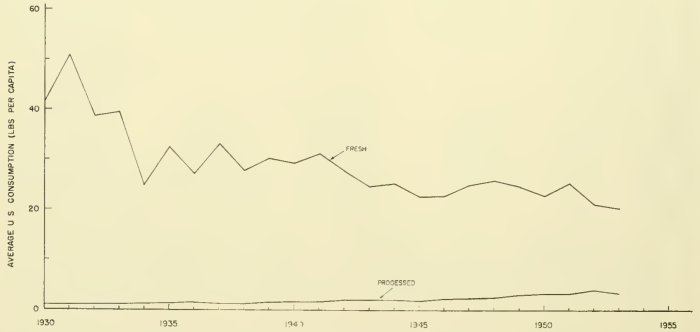


Figure 3. Average United States per capita consumption of apples, fresh and processed, in pounds, 1930-53.

The large drop in apple consumption during the 1930's can not necessarily be attributed to the drop in consumer income. Historical evidence of the relationship between producers' gross income from sales and apple production in New Hampshire shows that total income from apples has increased during periods of increased production. Similarly gross income from apple sales has declined with declines in apple production. This

could well mean that programs to restrict supplies sold will not necessarily increase the income of New Hampshire growers. (See Figure 4.) The continuing downward trend in consumption during the 1940's while income was obviously increasing can perhaps also be explained by the availability of competing fruits during practically every month of the year. Tremendous strides were made in both the transportation and refrigeration of fruits and vegetables during the war and post-war years. As a result, the consumer has now available many fruits throughout the year that he was not able to acquire during the 1930's, and it is reasonable to expect a drop in apple consumption.

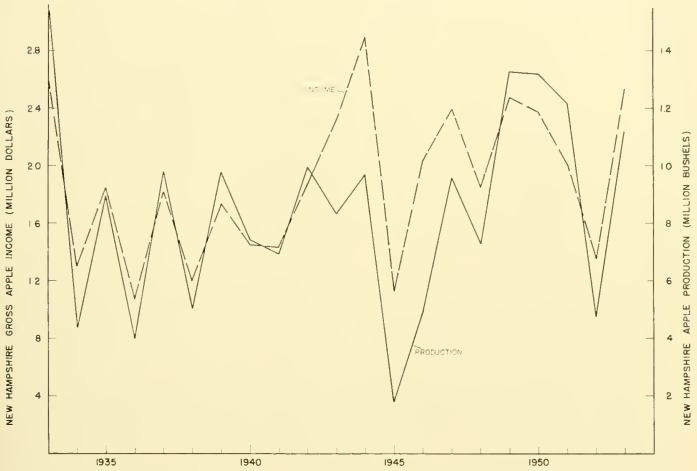


Figure 4. Relation between New Hampshire farm income from apples and size of apple crop, 1933-53. Farm income has been deflated by the wholesale prices of all commodities.

The per capita consumption of processed apples, on the other hand, has shown a slight increase. From approximately 0.9 pounds in 1930, the consumption of processed apples has increased to an estimated 3.0 pounds in 1949. The increase has been mainly in apple sauce and canned apples. Consumption of dried apples remained almost constant. Frozen apples were introduced during the late 1930's. Consumption started increasing during the war years and then declined. Canned apple juice consumption increased slightly but not at the same rate as apple sauce and canned apples. The increased consumption of processed apples was not large enough to compensate for the decrease in fresh consumption.

Utilization

Apples are marketed for fresh fruit sale or for processing. The amount utilized as fresh fruit among regions will depend partly on the varieties commonly grown in the region, nearness to consuming centers, prices, and available processing outlets.

Table 2. Percentage of Apple Production Used Fresh in the United States and New England, 1934-1953

Year	Untied States	New England
1934	69.6	73.1
1935	87.2	77.6
1936	70.4	76.9
1937	64.1	79.1
1938	71.5	73.1
1939	60.2	77.6
1940	70.2	80.0
1941	65.2	81.6
1942	61.4	76.1
1943	66.5	82.1
1944	64.2	77.1
1945	70.9	80.0
1946	63.6	78.6
1947	68.4	81.5
1948	72.6	85.5
1949	60.6	82.4
1950	61.5	80.7
1951	62.3	83.3
1952	69.7	86.0
1953	67.5	84.3

Source: Production, Farm Disposition, Value, and Utilization, Bureau of Agricultural Economics, United States Department of Agriculture, 1934-1953.

The relative amount utilized in each form varies not only among regions but also from year to year. The utilization from year to year will depend on market demand and prices. Table 2 shows the percentage of production consumed as fresh in both the United States and New England for a period of years.

A larger percentage of apples in New England go into the fresh fruit market than for the United States as a whole. The percentage of the total apple crop used fresh in the United States has remained fairly constant over the past 20 years, usually fluctuating between 60 and 70 percent of the total production. On the other hand, New England's contribution to the fresh fruit market during this same time interval has increased. The higher farm prices of New England apples relative to United States prices can in part be explained by the larger proportion sold on the fresh fruit market.

Assessing the Competition for New England Apples

Major Markets

Maine, New Hampshire, and Vermont are ordinarily surplus producing areas. Massachusetts, Rhode Island, and Connecticut*, because of their larger population, are more deficit areas. Consequently the movement of fresh apples is generally from northern New England toward southern New England and to major consuming areas lying outside of New England.

The two primary markets for fresh New England apples are New York and Boston. In recent years, however, small quantities of fresh apples have also been shipped to such markets as Baltimore, Washington, Chicago, and Cleveland. Table 3 shows the receipts of fresh apples in the New York City and Boston markets during 1953. It will be noted that a larger quantity of apples was shipped into New York City from New England than into the Boston market.

Secondary markets for New England apples are the larger cities within New England and in the bordering states. For New Hampshire such cities as Concord, Manchester, and Portsmouth within the state, and Haverhill and Lawrence in Massachusetts are usually the recipients of apples that are not shipped into New York, Boston, and other large consuming centers.

* Supply and demand in Connecticut are frequently in balance.

The apples not sold as fresh are processed into cider, vinegar, apple sauce, juice, and dried or frozen apples. Within New Hampshire there are only a few commercial processing plants and a limited number of cider plants.

Competition by Varieties and Time of Shipment

Competing areas can be classified by the varieties they grow and by the time of arrival on the market:

1. Those regions producing the same varieties and shipping to the same market at the same time as New England growers will present the strongest competition to New England producers.

Table 3. Receipts of New England Grown Fresh Apples on the New York City and Boston Markets by Origin, 1953

Origin States	Markets	
	New York City	Boston
	(carlots)[1]	(carlots)
Maine	44	61
New Hampshire	55	11
Vermont	659	24
Massachusetts	190	771
Rhode Island	—	—
Connecticut	126	13
Total	1074	880

[1] Carlot usually contains approximately 525 eastern crates.

Source: Unloads of Fresh Fruits and Vegetables at New York City and Boston, P. M. A., United States Department of Agriculture, 1953.

2. Those regions producing the same varieties but shipping to the common market at a different time will furnish less competition than those regions in 1.

3. Those regions producing a different variety but making it available in the market place at the same time as New England growers will be stronger competitors than those that grow the same variety but ship at a different time. The degree of competition that this type of region furnishes, will depend in part on the cross-elasticity of demand for the two varieties.*

4. Those regions shipping to markets other than New England markets will compete to a lesser degree than the previous cases. Since, as was noted, the prices of apples throughout the United States are interrelated, these regions will indirectly influence the price in New England markets.

Major Varieties Grown in Four Regions†

The major varieties of apples grown in the four regions under consideration are Delicious, Winesap, MacIntosh, Rome Beauties, and Staymen. Of the average 1942-1951 production in these regions, 29.1 percent were Delicious, 15. were Winesap, 13.8 were MacIntosh, 8.7 were Rome Beauties, and 6.8 were Staymens. The remaining 25.7 of the production was Gravenstein, Wealthy, Baldwin, Ben Davis and Gano, Cortland, Golden Delicious, Northern Spy, Rhode Island Greening, and some minor varieties.

New England—The varieties of most economic significance for New England are MacIntosh and Baldwin. Other varieties such as Delicious, Cortland, and Northern Spy are also grown, but contribute less to growers' incomes.

* Cross-elasticity of demand for a variety with reference to a second variety is the percentage change in the quantity taken of the first variety resulting from a percentage change in the price of the second variety, all other factors being held constant.

† New England, Mid-South Atlantic, Mid-West, and Far-West.

Table 4. Average Apple Production by Major Varieties, 1942-1951, in Thousands of Bushels

States and Regions	Varieties													Total of 13 Varieties
	Graven-stein	Wealthy	Bald-win	Ben Davis Gano	Cort-land	Deli-cious	Wine-sap	Golden Deli-cious	Mac-Intosh	Northern Spy	Rhode Island Greenings	Rome Beauty	Stay-men	
New England[1]	134	183	1,089	39	312	345	—	26	3,662	253	108	28	13	6,192
Mid-South Atlantic														
New York	—	714	1,574	646	1,321	611	—	—	4,550	666	1,974	733	—	12,789
New Jersey	23	54	50	—	26	241	55	124	208	—	24	584	421	1,810
Pennsylvania	—	161	173	157	145	516	85	239	277	70	11	717	1,449	4,000
Maryland & Del.	—	48	—	31	—	197	22	76	—	—	—	123	321	818
Virginia	—	—	—	420	—	915	1,421	290	—	—	—	158	1,186	4,390
West Virginia	—	—	—	206	—	370	94	151	—	—	—	282	413	1,516
North Carolina	—	1	—	21	—	190	60	141	—	—	—	82	233	728
Total	23	978	1,797	1,481	1,492	3,040	1,737	1,021	5,035	736	2,009	2,679	4,023	2,605
Mid-West														
Ohio[2]	—	109	384	42	53	314	—	137	148	56	49	628	346	2,266
Illinois	—	69	—	48	—	273	104	423	—	—	—	80	39	1,036
Michigan	—	411	398	113	—	544	—	101	1,099	812	173	—	94	3,745
Missouri	—	19	—	95	—	121	85	141	—	—	—	—	54	513
Total	—	608	782	298	53	1,252	189	802	1,247	868	222	708	533	7,562
Far West														
Idaho	—	—	—	41	—	417	82	16	—	—	—	495	15	1,066
Colorado	—	14	—	178	—	201	155	—	—	—	—	193	—	741
Washington	—	—	—	—	—	14,411	9,107	557	62	—	—	1,658	306	26,101
Oregon	50	—	—	—	—	772	46	—	—	—	—	85	—	953
California	2,436	—	—	—	—	629	144	—	—	—	—	421	—	3,630
Total	2,486	14	—	219	—	16,430	9,534	573	62	—	—	2,852	321	32,491
Total For All Regions	2,643	1,783	3,668	2,037	1,857	21,067	11,460	2,422	10,006	1,857	2,339	6,267	4,890	72,296

[1] State production figures not available.
[2] Ohio, Wisconsin, Minnesota, Iowa, Nebraska, Kansas, Kentucky, Tennessee, and Arkansas.

Source: Apple Production by Varieties, 1953, with Comparisons, A. M. S., United States Department of Agriculture.

Mid-South Atlantic—The Mid-South Atlantic states grow approximately eight major varieties. The larger number of varieties grown can be attributed to the greater divergence in climatic conditions in this region. Virginia and West Virginia specialize in such varieties as Ben Davis, Gano, Rome Beauties and Staymen while New York, New Jersey, and Pennsylvania produce mostly Baldwin, MacIntosh, and Rhode Island Greening.

Mid-West—The predominant varieties grown in the Mid-West are the Delicious and MacIntosh, and account for approximately 34 percent of the apples grown in this region. Other varieties grown are Northern Spy, Golden Delicious, and Baldwin. These three varieties comprise about 33.3 percent of total average production.

Far West—The Far West specializes in one major variety. The Delicious apple accounts for roughly 50.6 percent of the total production of 13 major varieties studied for this region. Of this 50.6 percent the State of Washington produces about 44.4 percent. The other varieties of economic significance in this region are Winesap, Rome Beauty, and Gravenstein. These three varieties combined amount to about 45.8 percent of the total production.

An area shipping to the same market at the same time as New England growers will furnish stronger competition than one that ships when New England apples are not on the market. Knowledge of these peak shipments from various states makes it possible to identify direct and indirect competitors of New England apples.

The Boston Market

The marketing season for New England apples extends from July through May. At either extreme of this span the amount of apples shipped into Boston from New England is negligible. The peak of New England apple shipments occurs from November through February.* Therefore, this is the time interval which is of extreme importance to New England growers. A large influx of apples from another state at this time could result in a drastic reduction in the price paid to New England growers.

Maryland, West Virginia, Pennsylvania, Missouri, Idaho, and California show no particular peak in the arrival of their respective apple shipments into the Boston market. One can assume that the shipments to Boston are spread evenly throughout their particular marketing period. New York, New Jersey, and Oregon reach their respective peaks of shipments to Boston after New England shipments have dwindled. Virginia and Washington both reach their peaks during the New England peak. Although Washington and Virginia do not raise the same varieties as New England, these two states furnish the strongest competition during January and February, in the height of the MacIntosh marketing season. New York and New Jersey grow similar varieties as New England but their peak arrivals do not coincide with New England's. Therefore, their competition is not as strong as that of Washington and Virginia.

The New York City Market

In the New York City market the marketing season for New England apples starts earlier than on the Boston market. The peak shipments into

* New techniques of storage are lengthening this market period.

the New York City market extend over a longer period of time. The peak of shipments from Vermont starts two months sooner to New York City than to Boston and the peak of shipments from Connecticut ends one month earlier.

It should be noticed that New York, New Jersey, Virginia, and Pennsylvania ship into New York City all year round. This can be attributed to their production of both fall and summer varieties. The peak shipments of these four states coincides with the peak shipments from New England. Therefore these states furnish the strongest degree of competition in the New York City market. Oregon and Washington reach their respective peaks after New England shipments of apples to New York have subsided. Therefore, these two states can be considered as indirect competitors as compared with New York, New Jersey, Virginia, and Pennsylvania.

Areas of Strongest Competition

In Boston the strongest competition faced by New England growers comes from Washington and Virginia. A certain degree of indirect competition is provided by New York, New Jersey, and Oregon.

The competition that faces New England in New York City comes from New York, New Jersey, Virginia, and Pennsylvania. The major indirect competition comes from Oregon and Washington.

Changes in the Contribution of Regions to the Major Markets

An attempt will be made here to quantify the strength of competition that New England faces and has faced in the past. Cities other than Boston and New York City are considered here since changes in the competitive picture in these cities will indirectly affect New England growers.

A demonstration of physical shipments by regions of origin to point of destination is not the most desirable way of measuring competiton. Over a period of years the production of apples fluctuates almost constantly, resulting in drastic increases and decreases in shipments to the various markets. Therefore, a better yardstick to measure competition than a historical observation of physical quantities is the percentage change in the supply of apples that regions contribute to each of the markets over a period of years. If the percentage contribution of a region changed over a span of years, then the change in the percent contributed might have been due to either: 1. a change in the total supply of apples within the contributing region, or , 2. a change in the demand for apples between regions relative to one another.

The reason the analysis is based on regional shipments rather than state shipments is because many apples lose their identity during the marketing process. To illustrate, many New Hampshire apples are shipped into Massachusetts. There they are repacked and sold by Massachusetts marketing agencies in the Boston and New York City markets as Massachusetts grown apples. These apples often find their way back to some of the larger New Hampshire cities and towns. In an analysis made on a state basis, it would be quite possible to overestimate one state's contribution and underestimate another's. To compensate for such discrepencies, it is necessary to deal with regional shipments rather than individual state contributions. The probability of some New England apples being shipped to another region and then returned to New England is quite small. Therefore, the regional approach is more accurate with available statistics.

Shipments by Regions, 1946-1953

The period chosen for observation was from 1946 to 1953. Complete data on apple shipments preceding 1942 are not available. The years 1942, 1943, 1944, and 1945 were not considered because of the war-time restrictions on both trucking and railroad shipments of all commodities. These restrictions probably prevented many distant regions from shipping into such eastern markets as New York City, Boston, and Washington, D. C. It was expected that an eight-year period, 1946 to 1953, would be sufficient to indicate any trends if they were present.

Statistics on railroad shipments of apples into the various cities is accurate. However, truck unloads are estimated to be between 60 and 90 percent complete among the cities observed. During the pre- and post-war years the usual carlot shipments contained approximately 525 eastern crates or 756 western boxes.

The percentage contributed to each market was calculated from data on total shipments from the various regions into each market. By dividing total market supply into each regional contribution to that market, it was possible to arrive at the percent contributed by the individual regions.

Table 5. New England Shipments to Various United States Markets as Percentage of Total Receipts, 1946-1953

Cities	Years							
	1946	1947	1948	1949	1950	1951	1952	1953
Atlanta	—*	—	—	—	—	.6	—	—
Baltimore	Tr†	Tr	—	.1	.6	1.1	.2	2.7
Boston	43.3	62.0	73.8	65.5	73.0	70.7	61.8	59.5
Chicago	—	—	—	—	—	—	.7	1.4
Cleveland	—	.1	—	—	—	.9	1.4	.5
New York	4.5	6.8	9.7	12.5	15.2	14.5	12.8	14.9
Philadelphia	.7	1.4	2.6	4.5	4.6	4.0	3.1	5.9
Pittsburgh	Tr	Tr	Tr	Tr	Tr	Tr	2.2	4.2
Washington	—	—	—	.2	1.2	2.3	1.6	4.7

Source: Based on data compiled from Unloads of Fresh Fruits and Vegetables. P. M. A., United States Department of Agriculture, 1946, 1947, 1948, 1949, 1950,1951,1952,1953.

* — indicates .1 percent or less of the total market.

† Tr indicates no trucking data were available.

New England Shipments

Table 5 shows the percent contribution to various markets throughout the United States from 1946 to 1953 by the New England states. It will be noted that the market area for New England apples extends approximately 500 miles outside of New England. Very few apples are shipped to markets located further. The major outlets for New England apples in 1946 were Boston, New York City, and Philadelphia. In the Boston market no discernable trend is noticeable. In New York City, Philadelphia, and Washington, however, there appears to be a general tendency for New England to have increased its share of these markets. This indicates that the New England growers are bettering their position.

In addition to increasing its share of the 1946 markets, New England has also acquired new markets. The new markets which have been opened to New England growers are Chicago, Cleveland, and Pittsburgh. Increases

in the contribution to established markets and the acquisition of new outlets for apples has influenced the competitive position of New England growers.

It should be noted that there is no apparent trend in the Boston market. The percentage of shipments into Boston depends on year-to-year fluctuations in the supply of apples. In markets further away there is a definite upward trend in the percentage of total market receipts from New England, which would indicate that the yearly supply of apples does not affect the quantity of apples shipped into these markets. If this is so, then the Boston market is the dumping area for surpluses, while the more distant markets are the recipients of a fairly even flow of apples.

Whenever one region increases its share of a market, one or another of the regions supplying this market must have reduced its share of the market or have withdrawn from the market altogether. In order to determine the effect of New England's increased shipments on other regions, it is necessary to examine the individual regions and the changes that have occurred in their contribution to the different markets.

Mid-South Atlantic Shipments

The percentage contributed by the Mid-South Atlantic regions to the various markets is shown in Table 6. It can be seen that this region has increased its share of the New York City market over the past eight years. In Chicago there has been an apparent decline in the percentage contributed while the percentage contributed in Philadelphia has remained fairly constant. In the remaining cities, Atlanta, Baltimore, Boston, Cleveland, St. Louis, and Washington, no apparent trends are noticeable.

Table 6. Mid-South Atlantic Shipments to Various United States Markets as Percentage of Total Receipts, 1946-1953

Cities	Years							
	1946	1947	1948	1949	1950	1951	1952	1953
Atlanta	33.2	32.6	44.2	22.3	20.0	53.3	64.4	38.0
Baltimore	Tr*	Tr	64.3	63.8	55.1	65.6	77.4	58.2
Boston	22.6	12.2	8.4	5.5	6.6	9.2	16.6	10.2
Chicago	4.1	4.5	2.8	1.4	2.1	3.0	3.7	1.4
Cleveland	15.0	19.9	27.0	27.4	28.0	24.4	26.6	16.1
Detroit	Tr	Tr	Tr	Tr	Tr	.9	2.3	1.6
Kansas City	3.6	.2	Tr	Tr	Tr	Tr	Tr	1.3
St Louis	3.2	1.4	1.1	.3	.7	.9	2.8	1.0
New Orleans	8.7	3.8	—†	—	3.9		16.2	4.4
New York	50.5	55.6	56.4	56.1	54.7	59.5	64.5	57.5
Philadelphia	68.0	68.4	66.3	65.1	66.6	67.9	80.0	66.0
Pittsburgh	Tr	Tr	Tr	Tr	Tr	Tr	61.7	21.0
Washington	54.4	65.3	64.8	74.8	54.8	75.1	82.1	58.7

Source: Based on data compiled from Unloads of Fresh Fruits and Vegetables, P. M. A., United States Department of Agriculture, 1946, 1947, 1948 1949, 1950, 1951, 1952, 1953.

* Tr indicates no trucking data were available.

† — indicates .1 percent or less of the total market.

Mid-West Shipments

The only common markets for the Mid-West and New England are Chicago, Cleveland, and Pittsburgh. Table 7 shows the contribution to the total market by the Mid-Western region. This region has increased its

Table 7. Mid-West Shipments to Various United States Markets as Percentage of Total Receipts, 1946-1953

Cities	Years							
	1946	1947	1948	1949	1950	1951	1952	1953
Atlanta	.8	6.7	4.3	37.5	9.4	13.1	7.3	19.9
Baltimore	Tr*	.2	—†	—	—	—	.1	.2
Boston	—	.2	.1	—	—	—	.2	Tr
Chicago	46.1	27.8	28.9	41.6	35.9	40.8	35.5	28.2
Cleveland	Tr	26.5	19.4	32.8	27.5	33.6	45.4	44.1
Denver	Tr	Tr	Tr	Tr	Tr	Tr	.6	5.0
Detroit	Tr	Tr	Tr	Tr	Tr	56.8	65.7	53.6
Kansas City	46.3		Tr	Tr	Tr	Tr	Tr	37.3
St. Louis	58.7	44.6	44.0	62.1	43.6	50.5	44.7	46.1
New Orleans	4.8	1.4			5.6		3.2	5.0
New York	.1	—	—	.1	—	—	—	—
Philadelphia	—	.5	.2	—	—	—	.2	—
Pittsburgh	Tr	Tr	Tr	Tr	Tr	Tr	7.2	12.1

Source: Based on data compiled from Unloads of Fresh Fruits and Vegetables, P. M. A., United States Department of Agriculture, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953.

* Tr indicates no trucking data were available.

† — indicates .1 percent or less of the total market.

share in only one market, Altanta. In Chicago and St. Louis no definite trend is noticeable. It should be noted, however, that shipments into New York City (1946 and 1949) occurred only when the Mid-West had a larger than usual share of its home markets. This indicates that New England is likely faced with competition from this region only when a very

Table 8. Far West Shipments to Various United States Markets as Percentage of Total Receipts, 1946-1953

Cities	Years							
	1946	1947	1948	1949	1950	1951	1952	1953
Atlanta	41.1	46.8	43.0	31.8	38.1	25.4	21.4	31.2
Baltimore	Tr*	Tr	34.5	34.9	30.6	30.9	20.5	31.0
Boston	25.1	22.2	15.6	25.3	17.5	15.6	13.6	22.1
Chicago	52.7	60.3	58.8	46.1	52.7	53.5	51.4	61.8
Cleveland	39.0	50.2	51.2	37.5	37.6	33.1	22.6	34.0
Dallas	Tr	Tr	Tr	Tr	Tr	Tr	91.0	95.8
Fort Worth	Tr	Tr	Tr	Tr	Tr	Tr	Tr	82.5
Denver	Tr	Tr	Tr	Tr	Tr	Tr	95.7	91.1
Detroit	Tr	Tr	Tr	Tr	Tr	37.9	30.0	42.2
Kansas City	43.4	63.1	Tr	Tr	Tr	Tr	Tr	57.7
St. Louis	36.8	73.9	47.9	33.2	49.8	44.8	47.2	49.4
Los Angeles	99.0	98.7	99.2	98.6	98.4	97.4	98.1	96.9
Oakland	100.0	100.0	100.0	99.7	100.0	100.0	100.0	99.5
San Francisco	80.9	100.0	99.9	100.0	100.0	99.9	97.4	99.0
New Orleans	79.4	93.0			82.7		75.8	83.7
New York	37.6	35.0	33.1	28.2	28.4	23.7	20.3	23.5
Philadelphia	26.8	26.5	28.5	27.1	25.4	23.6	13.5	25.0
Pittsburgh	Tr	Tr	Tr	Tr	Tr	Tr	23.1	29.7
Seattle	Tr	Tr	Tr	Tr	Tr	100.0	100.0	100.0
Washington	31.0	33.9	34.6	23.4	30.5	21.7	11.6	23.8

Source: Based on data compiled from Unloads of Fresh Fruits and Vegtables at Various United States Cities, P. M. A., United States Department of Agriculture, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953.

* Tr indicates no trucking data was available.

Table 9. Surplus-Deficit Regions in 1948

Income Groups (Dollars)	Total Persons Within Group [1]	Percentage of Persons Within Group	Ave. Per Capita Consumption of Fresh Apples (lbs.) [2]	Total Consumption (lbs.)	Total Cons. Adjusted For Missing Pop. (lbs.)	Total 1948 Production (lbs.) [3]
			New England			
0-1,999	2,200,494	25.73	25.00	55,012,350	58,532,925	
2,000-2,999	1,839,285	21.51	23.04	42,377,126	46,089,533	
3,000-3,999	1,775,832	20.76	27.44	48,728,830	51,846,590	
4,000+	2,736,870	32.00	30.50	83,474,535	88,816,275	
					245,285,323	262,800,000
Population 1 year or older, 1950 Census			9,099,790			
Table Population			8,552,481			
Difference Between Actual and Table Population			547,309 [4]	Production Surplus (+) or Deficit (—)		+17,514,677 lbs. or 364,889 bu.
			Mid-South Atlantic			
0-1,999	10,929,799	28.27	25.00	273,244,975	289,722,250	
2,000-2,999	7,694,513	19.90	23.04	177,281,580	187,971,011	
3,000-3,999	7,420,162	19.19	27.44	203,609,245	215,885,846	
4,000+	12,620,187	32.64	30.50	384,915,705	408,125,412	
					1,101,704,519	1,479,552,000
Population 1 year or older, 1950 Census			40,996,075			
Table Population			38,664,661			
Difference Between Actual and Table Population			2,331,414 [4]	Production Surplus (+) or Deficit (—)		+377,847,481 lbs. or 7,871,823 bu.

Mid West

0-1,999	7,378,035	25.92	25.00	184,450,875	195,445,100	
2,000-2,999	5,170,847	18.17	23.04	119,136,315	126,239,063	
3,000-3,999	5,935,067	20.85	27.44	162,858,238	172,565,111	
4,000+	9,980,202	35.06	30.50	304,396,161	322,538,842	
					816,788,116	545,712,000

Population 1 year or older, 1950 Census	30,160,790			
Table Population	28,464,151			
Difference Between Actual and Table Population	1,696,639[4]	Production Surplus (+) or Deficit (—)	—271,076,116 lbs.	or 5,647,419 bu.

Far West

0-1,999	4,068,491	26.66	25.00	101,712,275	106,715,775	
2,000-2,999	2,566,958	16.82	23.04	59,142,712	62,051,973	
3,000-3,999	3,124,571	20.47	27.44	85,738,228	89,954,960	
4,000+	5,501,967	36.05	30.50	167,809,994	176,064,270	
					434,786,978	1,782,144,000

Population 1 year or older, 1950 Census	16,012,700			
Table Population	15,261,987			
Difference Between Actual and Table Population	750,713[4]	Production Surplus (+) or Deficit (—)	+1,347,357,022 lbs.	or 28,069,938 bu.

[1] Census of Population, Volume II, Bureau of the Census, United States Department of Commerce, 1950.

[2] Extrapolated from 1948 Food Consumption Surveys, Agricultural Research Service, United States Department of Agriculture, 1949.

[3] E. O. Schlotzhauer and O. M. Frost, "Fruits, Production, Farm Disposition, Value, and Utilization of Sales, 1944-49." Bureau of Agricultural Economics, Statistical Bulletin No. 114, United States Department of Agriculture. Washington, D. C., October 1952.

[4] Distributed between income groups.

large supply of apples is produced in the Mid-West region. In such markets as Dallas, Fort Worth, Denver, and Detroit, trucking data were not available for most of the observed years. Therefore little can be stated about the trends in these particular markets.

Far-West Shipments

Table 8 shows the percentage that the Far West contributes to various markets throughout the United States. It will be seen that the Far West has declined considerably in New York City, Baltimore, Atlanta, and Washington, There has also been a decline in the percent contributed to the Boston and Philadelphia markets. However, this drop has been slight in comparison with the decrease in New York City, Atlanta, Baltimore, and Washington. In Chicago and St. Louis no trends are apparent. In the western markets, Los Angeles, Oakland, and San Francisco, the percentage contributed has been fairly constant. In the other markets shown in Table 8 not enough data are available to make any definite statement about changes in the percent contributed to the total market.

Market Summary

New England has increased its share of the market in New York City, Philadelphia, and Washington. New markets which have been opened to New England growers are Chicago, Cleveland, and Pittsburgh. In none of its major markets has there been a drop in the contribution such as has occurred for some of the other producing regions. The Far West has lost its share of those markets where New England has gained.

In the Mid-West region little change has occurred since 1946. Only in Atlanta, has this region increased its share of the market. In all other markets no definite trends were noticeable.

The Mid-South Atlantic region has increased its share of the New York City market. In Philadelphia, the percent contributed has been fairly constant while the percent contributed to Chicago has declined. In all the other markets there were either no trends noticeable or not enough data were available to observe any change if a change were present.

Potential Markets and Competition

The following analysis provides us with estimates of the surplus or deficit supply of apples by the four major apple growing regions. The amount of surplus or of deficit will indicate the degree to which regions will be importing apples or shipping to markets outside the region.

The estimates are based on 1948 production. The 1950 census of population and consumption by income groups is based on the 1948 Food Consumption Surveys of the USDA The results as shown in Table 9 indicate that the largest surplus apple supply region is the Far West with 28 million bushels, followed by the Mid-South Atlantic Region with almost 8 million bushels and the New England Region with 365,000 bushels.

The Mid-West Region is deficit by over five million bushels and contains potential markets for the surplus producing regions.

Estimating the Future Competitive Position

Besides identifying New England's competitors and evaluating the strength of their competition, it is the purpose of this study to determine the long run competitive position of New England in 1965. More spec-

Table 10. Surplus-Deficit Regions Under Assumptians Made in Assumption One

Income Groups	Individuals Within Groups[1]	Average Per Capita Consumption (lbs.)[2]	Total Consumption (lbs.)	Total Production (lbs.)[3]
New England				
0-1,999	2,442,246	25.00		
2,000-2,999	2,050,553	23.04		
3,000-3,999	1,991,025	27.44		
4,000-and over	3,080,205	30.50		
Total New Population	9,564,029	Total Cons. and Prod.	256,880,870	262,800,000
		Production Surplus (+) Deficit (—)	+5,919,129 lbs. or 123,315 bu.	
Mid-South Atlantic				
0-1,999	12,029,858	25.00		
2,000-2,999	8,475,526	23.04		
3,000-3,999	8,196,449	27.44		
4,000-and over	13,985,115	30.50		
Total New Population	42,686,948	Total Cons. and Prod.	1,147,479,137	1,479,552,000
		Production Surplus (+) Deficit (—)	+332,072,863 lbs. or 6,918,185 bu.	
Mid-West				
0-1,999	8,339,963	25.00		
2,000-2,999	5,852,063	23.04		
3,000-3,999	6,726,283	27.44		
4,000-and over	11,304,698	30.50		
Total New Population	32,223,007	Total Cons. and Prod.	872,693,101	545,721,000
		Production Surplus (+) Deficit (—)	—326,981,101 lbs. or 6,812,106 bu.	
Far-West				
0-1,999	4,838,188	25.00		
2,000-2,999	3,049,839	23.04		
3,000-3,999	3,718,032	27.44		
4,000-and over	6,572,251	30.50		
Total New Population	18,178,310	Total Cons. and Prod.	493,699,444	1,782,000
		Production Surplus (+) Deficit (—)	+1,288,444,556 lbs. or 26,842,595 bu.	

[1] Census of Population, Volume II. and Current Population Reports. Population Estimates, Bureau of the Census, Series P-25, Number 104. United States Department of Commerce.

[2] Extrapolated from, 1948 Food Consumption Surveys, Agricultural Research Service, United States Department of Agriculture, 1949.

[3] E. O. Schlotzhaner and O. M. Frost, "Fruits, Production, Farm Disposition, Value, and Utilization of Sales, 1944-49," Bureau of Agricultural Economics, Statistical Bulletin No. 114, United States Department of Agriculture, Washington, D. C., October, 1952.

ifically, the problem is to estimate the changes in the supply of apples, population, and per capita consumption of apples so that a fairly accurate picture can be derived concerning New England's future. The general trend in apple production during the past 20 years has been downward for all regions but New England (see Appendix, figures 5, 6, 7, 8). Continuation of these trends will find New England in a favorable position for market expansion.

Two possible situations with respect to the variables affecting the future of the apple industry are considered here. Only two alternatives were postulated because they seemed to be the most likely to occur in the next 10 years.

First Assumptions—In the first situation, the assumptions are (a) that income distribution will be the same in 1965 as it was in 1950; (b) that the average per capita consumption of apples levels off, therefore, the same average per capita consumption figures by income classes can be applied in 1965 as was used in 1948; (c) that apple production within all regions considered has leveled off at the 1948 figure;* and (d) that changes in population numbers will occur within the individual states.

Second Assumptions—In the second possible situation in 1965, the assumptions are that (a) income distribution is held constant; (b) average per capita consumption by income groups is again held constant; (c) the same population changes are postulated as before, but (d) it is assumed that the general production trend by regions for the past 20 years will continue at the same rate until the year 1965.

Thus, in assumption one, everything is held constant except population. In assumption two, population and supply of apples are varied while the rest of the factors are held constant.

Assumption One

Assuming that our first assumptions will prevail in 1965, the situation facing the growers in the various regions is shown in Table 10. New England will have decreased its surplus of apples from 365,000 bushels in 1948 to approximately 125,000 bushels. This reduction is due to the increased total consumption assumed as a result of the increase in population within New England. This movement toward a closer balance of the consumption-production relationship alleviates somewhat the problem of surplus disposal. However, before any definite statement can be made about the New England apple grower's relative position, a closer examination must be made of the regions that compete with New England.

Referring again to Table 10 it can be seen that the surplus in the Mid-South Atlantic region will have been reduced by approximately 950,000 bushels from 1948 (Table 9). As a result of this reduction it is safe to assume that fewer apples from this region will be available for shipment into New England and other markets. This reduction of apple shipments will reduce the competition that New England apple growers have to face, and will make it easier to dispose of New England apples.

The Mid-West was a deficit area in 1948. As a result of the assumptions postulated in Assumption One, the deficit will be increased by more than one million bushels. This increase in the deficit will probably result in a

* Production in 1948 was relatively low so that this may be an underestimation.

Table 11. Surplus-Deficit Regions Under Assumptions Made in Assumption Two

Income Groups	Individuals Within Groups[1]	Average Per Capita Consumption (lbs.)[2]	Total Consumption (lbs.)	Total Production (lbs.)[3]
		New England		
0-1,999	2,442,246	25.00		
2,000-2,999	2,050,553	23.04		
3,000-3,999	1,991,025	27.44		
4,000-and over	3,080,205	30.50		
Total New Population	9,564,029	Total Cons. and Prod.	256,880,870	384,416,000
		Production Surplus (+) Deficit (—)	+127,535,130 lbs.	or 2,656,981 bu.
		Mid-South Atlantic		
0-1,999	12,029,858	25.00		
2,000-2,999	8,475,526	23.04		
3,000-3,999	8,196,449	27.44		
4,000-and over	13,985,115	30.50		
Total New Population	42,686,948	Total Cons. and Prod.	1,147,479,137	1,304,616,000
		Production Surplus (+) Deficit (—)	+157,136,863 lbs.	or 3,273,685 bu.
		Mid-West		
0-1,999	8,339,963	25.00		
2,000-2,999	5,852,063	23.04		
3,000-3,999	6,726,283	27.44		
4,000-and over	11,304,698	30.50		
Total New Population	32,223,007	Total Cons. and Prod.	872,693,101	752,748,000
		Production Surplus (+) Deficit (—)	—119,945,101 lbs.	or 2,498,856 bu.
		Far-West		
0-1,999	4,838,188	25.00		
2,000-2,999	3,049,839	23.04		
3,000-3,999	3,718,032	27.44		
4,000-and over	6,572,251	30.50		
Total New Population	19,178,310	Total Cons. and Prod.	493,699,444	1,611,277,000
		Production Surplus (+) Deficit (—)	+1,117,577,556 lbs.	or 23,282,287 bu.

[1] Census of Population, Volume II, and Current Population Reports, Population Estimates, Bureau of the Census, Series P-25, Number 104, United States Department of Commerce.

[2] Extrapolated from, 1948 Food Consumption Surveys, Agricultural Research Service, United States Department of Agriculture, 1949.

[3] Calculated from curvilinear regression equations derived from regional production trends.

larger quantity of apples moving into this region from the current supplying regions (Mid-South Atlantic and Far West).

In Table 10 it will be seen that the surplus in the Far West has been reduced by approximately one million bushels since 1948. This reduction may again result in a smaller quantity of apples leaving this region and moving into New England and competing markets.

Assumption One Summary

Under our first assumption New England will have reduced its supply of surplus apples. The Mid-South Atlantic and Far West will have reduced their supply of surplus apples. The Mid-South Atlantic and Far West regions will also have reduced the surplus they have to contend with. As a result, fewer apples will be shipped into New England markets, thereby lessening the competition that New England growers have to face. Secondly, the increase in the deficit in the Mid-West region will result in more apples moving into this region than previously, which will in turn probably result in a decrease in the number of apples coming into New England markets. So, it can be seen that the amount of competition facing New England growers will be reduced because: 1. the New England surplus will be reduced, 2. the surplus of the Mid-South Atlantic and Far West regions will also be reduced, and 3. the increase in the deficit in the Mid-West region will pull some apples away from traditional New England markets into the Mid-West markets.

Assumption Two

Table 11 shows the situation prevailing as a result of the assumption of a continuation of past production trends by regions. New England is the only region where the production of apples has been increasing since 1934. The remaining regions, Mid-South Atlantic, Mid-West, and the Far West, have all been declining.

As a result of the increase of apple production in New England and the very slight increase in population, the surplus with which New England growers will be faced in 1965 will be approximately 2½ million bushels. Here again, no evaluation of New England's competitive position can be arrived at until the other regions are examined as well.

In 1948 and under our first assumption, the Mid-South Atlantic region was a surplus area. However, as a result of the downward trend of apple production and the increase in population this region will now have a smaller surplus. The Mid-West, as previously, will still be a deficit area. However, the deficit will not be as large as before. The Far-West will still be a surplus region. However, the surplus is smaller than it was in 1948 and under Assumption One. This will result in smaller shipments of apples out of this region than in 1948 and the first assumption.

Assumption Two Summary

Under Assumption Two New England will be in a better relative position than it was in 1948. The Mid-South Atlantic will now have a smaller surplus which will increase the possibility of New England expanding its markets and reducing its surplus. Since New England is closer to the Mid-South Atlantic and Mid-West regions than is the Far West, New England should be able to take advantage of any lower transportation costs and compete successfully for the Mid-South Atlantic and Mid-West markets.

Therefore, under both assumptions New England growers will be in a better relative position in the long run than they have been in the recent past.

It should be noticed that under both assumptions, income distribution was assumed constant and no consideration was taken of processed apples. If the assumptions included a trend toward a more equal income distribution, then total consumption would probably be greater than is postulated under either assumption. If it had been assumed that per capita consumption of processed apples remained fairly constant, then an increase in population would result in an increased total consumption of processed apples. Some apples may be diverted from fresh to processed use so that the estimated supply of fresh apples in both assumptions would be an overestimation of total fresh supply.

Summary and Conclusions

The major apple producing regions of the United States considered in this study were the Far West, Mid-West, Mid-South Altantic and New England. Short-run year-to-year apple production has fluctuated in the same general direction in all four regions. However, long-run apple production from 1934 to 1953 has not moved in the same direction. Since 1934, New England apple production has been increasing while production in the other three regions has been declining.

Apple prices received by New Hampshire growers are part of the structure of prices in New England which in turn bears a definite and fairly stable relationship to United States prices.

Change in the demand for apples usually comes about because of: a change in the price ratio of apples and other substitutable fruits, and changes in consumer tastes, income, fixed commitments, and / or increased knowledge.

Since two distinct situations may bring about a change in the demand for apples, it is of considerable importance to know which has occurred when formulating marketing policies. If the change in demand was brought about by a change in the relative prices, then a readjustment of the price ratio would undoubtedly cause the consumer to shift back to his or her original purchasing pattern. If the change in demand, however, was brought about by a change in tastes, income, and so on, adjustment of the price ratio would probably not bring about the desired goal. Thus, it may be necessary to supplement a change in the price ratio with other appropriate methods of influencing demand to obtain the desired objectives.

The per capita consumption of fresh apples in the United States has been declining since 1930. The per capita consumption of processed apples, on the other hand, has shown a rather slight increase. Since 1948, per capita consumption of fresh apples has leveled off at approximately 25 pounds per person. However, the increased consumption of processed apples was not large enough to compensate for the decrease in fresh consumption.

Competition by Varieties and Time of Shipment

In order to evaluate the competitive position of one region relative to others, it is necessary to identify the competing regions or states within the regions. Knowledge of the competitors makes it possible to observe the behavior of producers in these areas and as a result adjust accordingly. The major varieties grown in New England are MacIntosh and Baldwin apples. The other areas where a considerable amount of MacIntosh are grown are New York and Michigan. Baldwins are primarily grown in New York, and smaller quantities of Baldwins are also raised in Ohio and Michigan.

In the Boston market the states shipping at the same time as New England growers are Virginia and Washington. New York, New Jersey, and Oregon apples generally come into Boston after New England shipments have dwindled. In the New York City market the major direct competitors of New England apples are New York, New Jersey, Virginia, and Pennsylvania. Oregon and Washington reach their respective peaks after New England shipments of apples have subsided. It should be noticed that New England growers faced different competitors in each of the two markets

mentioned and therefore the adjustments to be made in the New England apple industry will depend on which of the two markets is of primary interest to New England.

New Markets

Since 1946, New England has increased its share of the markets in New York City, Philadelphia, and Washington, New England has also been able to gain entrance into Chicago, Cleveland, and Pittsburgh markets into which they never shipped before.

The region which apparently has lost in the markets that New England has gained is the Far West.

The Mid-South Atlantic region has increased its share of the New York City market, remained fairly constant in Philadelphia, and has declined in Chicago. In the other cities there were either no trends noticeable or not enough data were available to observe any change if a change were present.

Prospects for New England

The problem was to determine the long-run competitive position of New England so that growers would have a rough idea of what to expect in the future and therefore adjust their farm operations accordingly. To arrive at a clear picture of the fnture of the New England apple industry it was necessary to estimate change in the supply of apples, population, and per capita consumption of apples. With this knowledge it then became possible to determine into which regions New England would find entrance. Two alternative situations with respect to the variables affecting the future of the apple industry were considered. The two alternatives were chosen because they seemed to be the most likely to occur in the next 10 years. Both assumptions indicated that New England growers will be in a better relative position in the long run than they have been because New England as a whole will decrease its surplus and should be able to increase its sale of total apples. See Tables 10 and 11.

The analysis of the competitive position of the New England apple industry shows that New England growers as a whole have had an improved competitive position relative to growers in other regions. Opportunities for profitable production expansion are present in this region.

The benefits from expansion and the potential gains from increased sales of apples will vary between producers. The size of the farm, the capital investment, and the combination of resources available will determine whether growers can adapt their orchards to changes in market opportunities.

For example, three major management adjustments which could be made are 1. to increase production by improved cultural practices with no change in capital or size of farm, 2. to increase the number of trees without additional investment in equipment, buildings, or permanent labor, and 3. to increase acreage of bearing trees through increases in land, labor, and equipment.

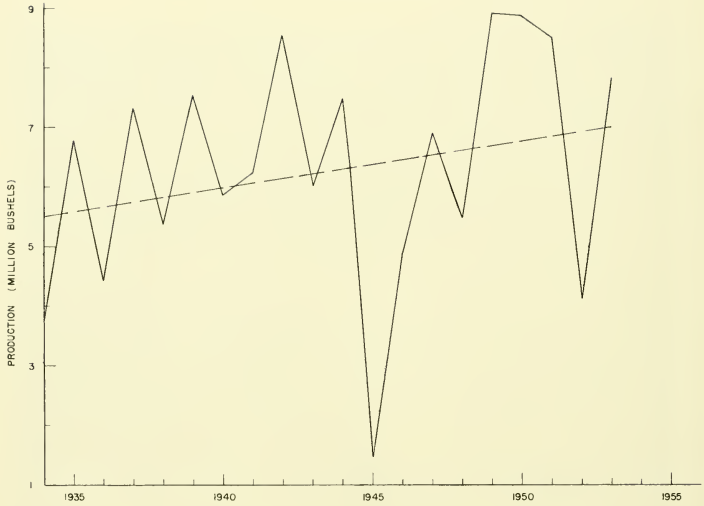


Figure 5. New England total apple production, 1934-53.

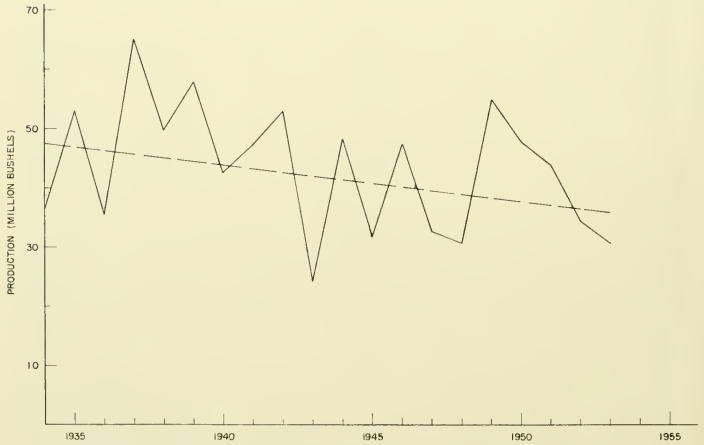


Figure 6. Mid-South Atlantic total apple production, 1934-53.

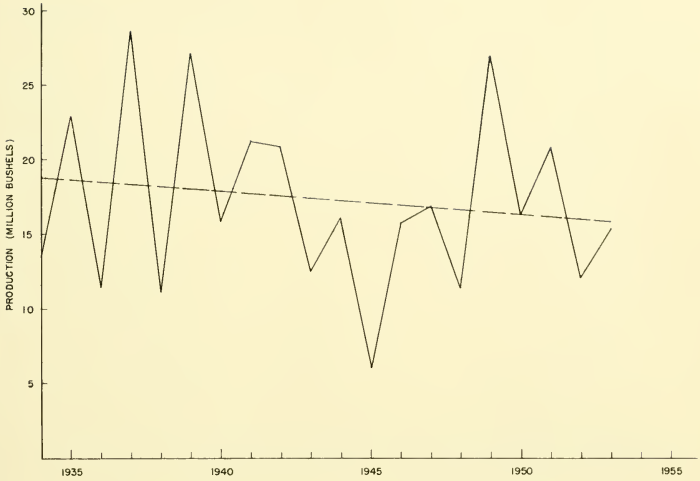


Figure 7. Mid-West total apple production, 1934-53.

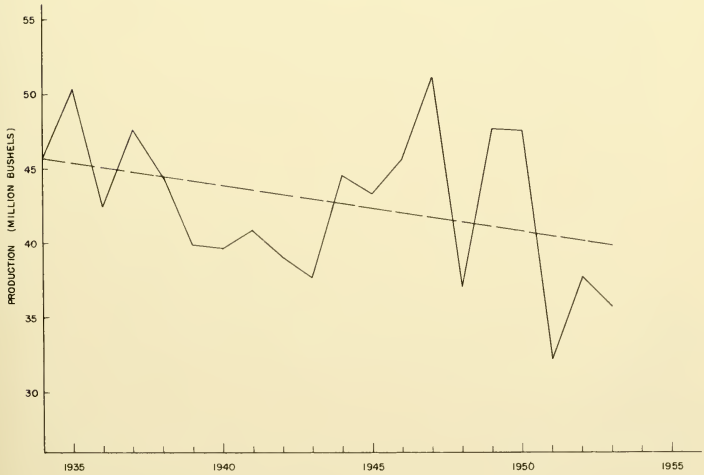


Figure 8. Far West total apple production, 1934-53.

630.72
N532
no.426-450
DATE DUE

NOV 4 '64	
MAY 19 '65	
Sept 24	
OCT 28 '68	
	F32a